

California Water Supply Outlook Report

February 1, 2020

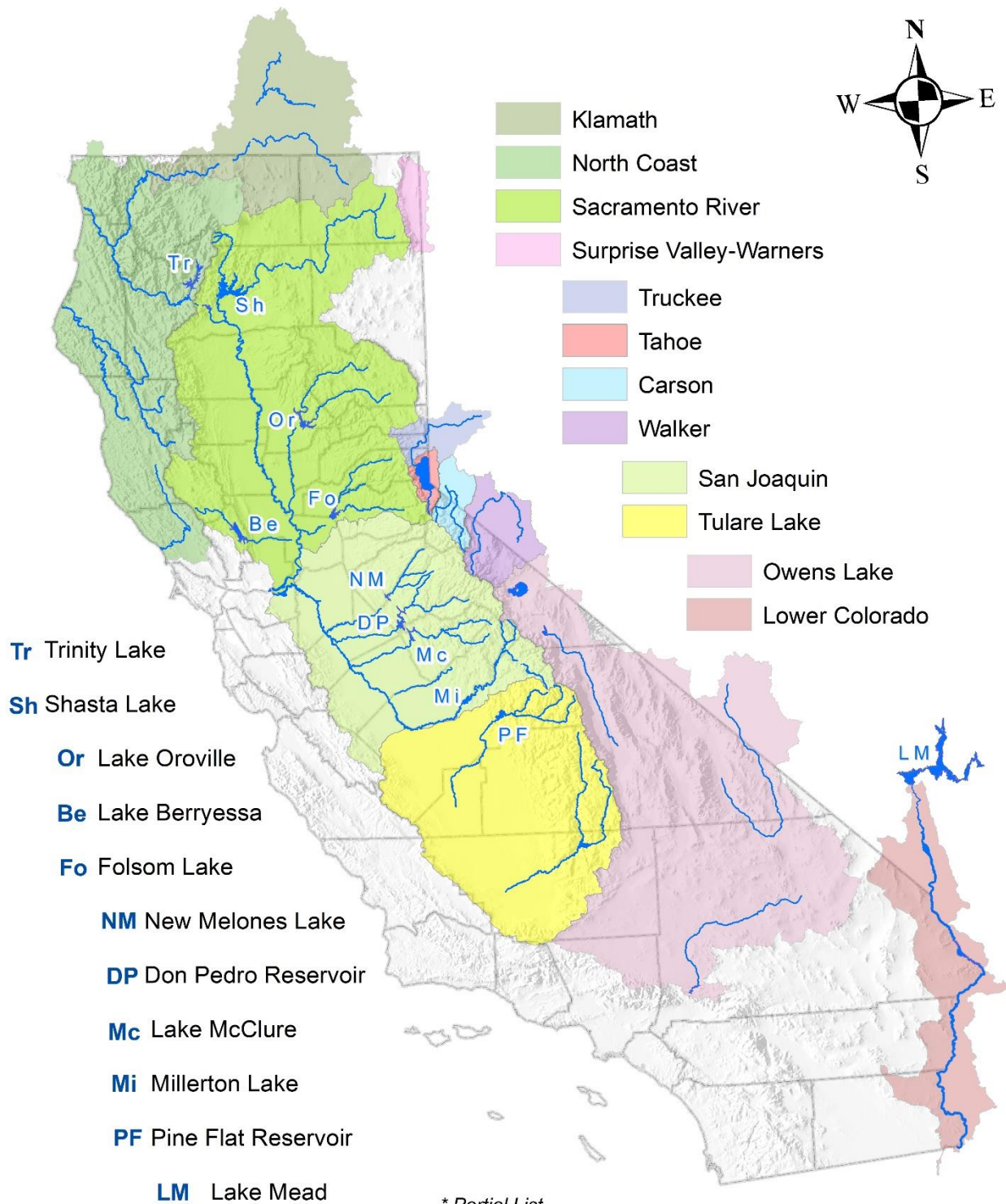


Meadow at Camp Sacramento, looking south across Interstate 50. The snow water equivalent averaged for the stations in northern California on January 25, 2020 when this photo was taken, was 80 percent of normal.

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California Forecast Basins, Major Rivers, and Large Reservoirs*



STATE OF CALIFORNIA GENERAL OUTLOOK

February 1, 2020

SUMMARY

Warm, dry conditions in January reduced the average statewide snowpack from 94 percent at the end of December, to 70 percent by January 31st. Below average precipitation dropped the totals for the water year through January, to 64-, 57- and 57 percent of average for the north, central, and southern regions, respectively. Total reservoir storage (not including the Colorado River) stood at 110 percent of average on January 31st, compared to 99 percent of average a year ago.

SNOWPACK

Snow gages in the northern-, central-, and southern mountains recorded snow water equivalents on January 31st that averaged 75-, 69-, and 66 percent of normal for the date, respectively. Snowpack losses in the southern region were particularly notable, dropping from 109 percent of average on December 31, 2019.

More information is available online at

<http://cdec.water.ca.gov/snow/current/snow/index2.html>.

PRECIPITATION

Precipitation in the Northern Sierra (8-Station) region was 55 percent of the monthly average for January, respectively. The San Joaquin- and Tulare basin regions were even drier, with January precipitation just 19- and 12 percent of average, respectively.

More information is available online at http://cdec.water.ca.gov/snow_rain.html

RESERVOIRS

Total reservoir storage (excluding Lake Powell and Lake Mead) as of *January 31st* stood at 110 percent of average, including 115- and 140 percent at Shasta and New Melones, respectively. Storage in Lake Mead was 55 percent of the month-end average, with forecast inflows into Lake Powell between April and July estimated at 80 percent of average.

More information is available online at http://cdec.water.ca.gov/snow/reservoir_ss.html.

STREAMFLOW

Streamflow forecasts for all regions are below average. Forecasts for stations in the Sacramento, San Joaquin, and Tulare basins (Apr-Jul) range between 28- and 88 percent of average, with the lowest estimates posted for the southern basin streams. NRCS forecasts for stations in the Tahoe, Truckee, Carson, and Walker River basins (for periods starting in April) range between 61- and 84 percent of average, with the lowest estimates posted for the Truckee River basin. DWR-, NRCS- and NWS forecasts for stations in the Klamath Basin (March or April through September) and the North Coast (Apr-Jul) range between 61- and 84 percent of average. Summaries are provided below.

Sacramento River Basin

National Weather Service (NWS) streamflow forecasts at 13 sites range between 57- and 79 percent of average between April and July (APR-JUL). Department of Water Resources (DWR) streamflow forecasts for APR-JUL at 18 sites range between 63- and 88 percent of average.

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SACRAMENTO RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Sacramento R at Shasta (DWR)								
	APR-JUL			200	68			295
Sacramento R at Shasta (NWS)								
	APR-JUL	100	135	192	61	288	374	312
McCloud R ab Shasta (DWR)								
	APR-JUL			340	88			385
McCloud R ab Shasta (NWS)								
	APR-JUL	196	226	266	69	334	394	385
Pit R at Shasta Lk (DWR)								
	APR-JUL			870	85			1020
Pit R at Shasta Lk (NWS)								
	APR-JUL	544	594	674	67	826	1019	1013
Inflow to Shasta Lk (DWR)								
	OCT-SEP	3665		4215	72		4930	5831
	APR-JUL	1150		1420	81		1660	1756
Inflow to Shasta Lk (NWS)								
	APR-JUL	959	1095	1316	73	1730	2190	1803
Sacramento R nr Red Bluff (DWR)								
	OCT-SEP	4860		5740	67		6600	8544
	APR-JUL	1400		1800	74		2190	2421
Sacramento R nr Red Bluff (NWS)								
	APR-JUL	1322	1496	1825	74	2495	3185	2479
Feather R at Lk Almanor (DWR)								
	APR-JUL			210	63			333
NF Feather R at Pulga (DWR)								
	APR-JUL			680	66			1028
NF Feather R nr Prattville (NWS)								
	APR-JUL	136	152	190	57	233	284	333
MF Feather R nr Clio (DWR)								
	APR-JUL			55	64			86
SF Feather R at Ponderosa Dam (DWR)								
	APR-JUL			70	64			110

Sacramento River Basin cont'd

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SACRAMENTO RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Inflow to Oroville Res (DWR)								
	OCT-SEP	2145		2785	63		3445	4407
	APR-JUL	750		1100	65		1460	1704
Inflow to Oroville Res (NWS)								
	APR-JUL	628	779	1084	64	1458	1951	1701
N Yuba R bl Goodyears Bar (DWR)								
	APR-JUL			210	75			279
N Yuba R bl Goodyears Bar (NWS)								
	APR-JUL	107	130	179	65	258	328	273
Inflow Jackson Mdws & Bowman Res (DWR)								
	APR-JUL			85	76			112
S Yuba R nr Langs Crossing (DWR)								
	APR-JUL			170	73			233
Yuba R at Smartville (DWR)								
	OCT-SEP	1120		1450	64		1885	2268
	APR-JUL	510		720	74		1000	968
Yuba R at Smartville (NWS)								
	APR-JUL	365	462	649	66	938	1214	981
NF American R at N FK Dam (DWR)								
	APR-JUL			190	73			262
MF American R nr Auburn (DWR)								
	APR-JUL			380	73			522
MF American R nr Auburn (NWS)								
	APR-JUL	174	235	312	64	448	582	490
Inflow to Union Valley Res (NWS)								
	APR-JUL	44	54	73	74	100	119	98
Silver Ck bl Camino Div. Dam (DWR)								
	APR-JUL			125	72			173
Silver Ck bl Camino Div. Dam (NWS)								
	APR-JUL	78	93	124	79	172	206	158
Inflow to Folsom Res (DWR)								
	OCT-SEP	1195		1620	62		2165	2626
	APR-JUL	600		880	73		1240	1199
Inflow to Folsom Res (NWS)								
	APR-JUL	417	568	766	62	1127	1471	1232

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

San Joaquin River Basin

National Weather Service (NWS) streamflow forecasts at eight sites range between 41- and 66 percent of average between April and July (APR-JUL). Department of Water Resources (DWR) streamflow forecasts for APR-JUL at 13 sites range between 52- and 79 percent of average.

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SAN JOAQUIN RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Cosumnes R at Michigan Bar (DWR)								
	OCT-SEP	100		160	42		250	379
	APR-JUL	35		65	52		110	125
Cosumnes R at Michigan Bar (NWS)								
	APR-JUL	20	33	53	41	90	166	128
NF Mokelumne R nr West Point (DWR)								
	APR-JUL			340	78			437
Inflow to Pardee Res (DWR)								
	OCT-SEP	370		510	68		675	748
	APR-JUL	250		360	79		490	457
Inflow to Pardee Res (NWS)								
	APR-JUL	190	232	306	66	418	550	467
MF Stanislaus R bl Beardsley (DWR)								
	APR-JUL			230	69			334
Inflow to New Melones Res (DWR)								
	OCT-SEP	630		750	65		970	1149
	APR-JUL	390		480	70		640	682
Inflow to New Melones Res (NWS)								
	APR-JUL	248	347	440	64	650	857	690
Cherry & Eleanor Cks, Hetch Hetchy (DWR)								
	APR-JUL			230	73			315
Tuolumne R nr Hetch Hetchy (DWR)								
	APR-JUL			430	71			604
Tuolumne R nr Hetch Hetchy (NWS)								
	APR-JUL	239	298	356	60	495	605	596

California Streamflow Forecasts- February 1, 2020

San Joaquin River Basin, cont'd

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SAN JOAQUIN RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Inflow to New Don Pedro Res (DWR)								
	OCT-SEP	1050		1260	66		1600	1909
	APR-JUL	700		860	72		1120	1193
Inflow to New Don Pedro Res (NWS)								
	APR-JUL	456	601	717	58	1071	1427	1228
Merced R, Pohono Bridge Yosemite(DWR)								
	APR-JUL			250	67			372
Merced R, Pohono Bridge Yosemite (NWS)								
	APR-JUL	129	164	210	55	310	398	384
Inflow to Lake McClure (NWS)								
	APR-JUL	169	225	301	47	495	678	642
San Joaquin R at Mammoth Pool (DWR)								
	APR-JUL			740	72			1026
Big Ck bl Huntington Lk (DWR)								
	APR-JUL			65	71			91
SF San Joaquin R nr Florence Lk (DWR)								
	APR-JUL			145	72			201
Inflow to Millerton Lk (DWR)								
	OCT-SEP	900		1145	64		1425	1793
	APR-JUL	680		880	72		1110	1228
Inflow to Millerton Lk (NWS)								
	APR-JUL	350	415	645	51	942	1301	1258

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Tulare Lake Basin

National Weather Service (NWS) streamflow forecasts at four sites range between 28- and 61 percent of average between April and July (APR-JUL). Department of Water Resources (DWR) streamflow forecasts for APR-JUL at six sites range between 56- and 72 percent of average.

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast

TULARE LAKE BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
NF Kings R nr Cliff Camp (DWR)								
	APR-JUL			170	71			239
Inflow to Pine Flat Res (DWR)								
	OCT-SEP	860		1145	67		1430	1702
	APR-JUL	630		870	72		1110	1210
Inflow to Pine Flat Res (NWS)								
	APR-JUL	459	568	751	61	1090	1370	1231
Kaweah R at Terminus Res (DWR)								
	OCT-SEP	210		260	58		340	451
	APR-JUL	140		180	63		240	285
Kaweah R at Terminus Res (NWS)								
	APR-JUL	95	117	159	55	283	401	288
Tule R at Success Res (DWR)								
	OCT-SEP	45		71	48		105	147
	APR-JUL	20		35	56		55	63
Tule R at Success Res (NWS)								
	APR-JUL	9	12	18	28	38	64	63
Kern R nr Kernville (DWR)								
	APR-JUL			250	65			384
Inflow to Isabella Res (DWR)								
	OCT-SEP	380		500	69		645	728
	APR-JUL	210		300	66		410	458
Inflow to Isabella Res (NWS)								
	APR-JUL	130	163	229	50	329	485	454

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

North Coastal Area Basin

Streamflow forecasts for sites in the North Coastal Area Basin between April and July (APR_JUL) range between 61- and 72 percent.

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

NORTH COASTAL AREA	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Trinity R at Lewiston (DWR)								
	OCT-SEP	635		870	65		1030	1348
	APR-JUL	310		460	72		560	639
Inflow to Clair Engle Lk (NWS)								
	APR-JUL	243	310	420	63	563	703	666
Scott R nr Fort Jones (NWS)								
	APR-JUL	60	74	106	61	142	183	173

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Klamath Basin

Including information from the Water Supply Outlook Report for Oregon
https://www.wcc.nrcs.usda.gov/ftpref/states/or/watersupply/2020/WSOR_2020_Feb.pdf:

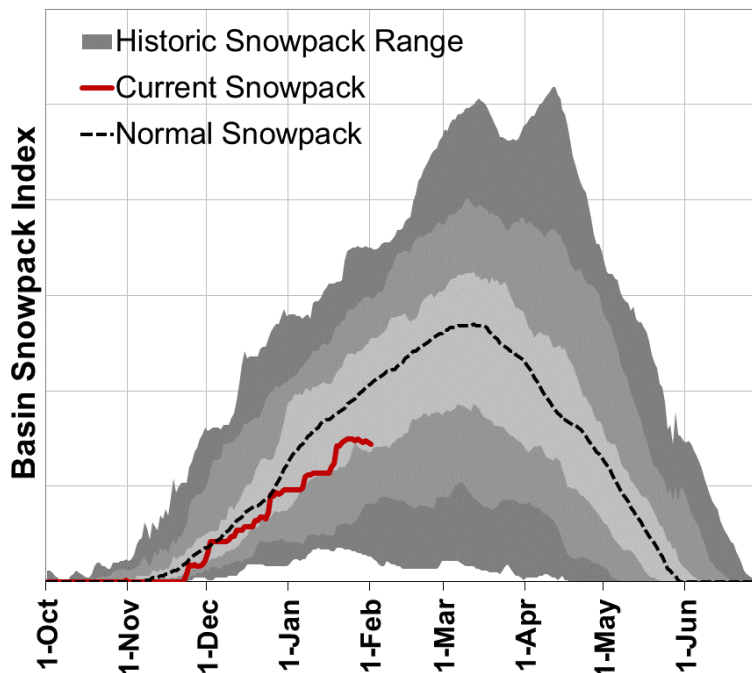
As of February 1, the basin snowpack was 69% of normal. This is slightly lower than last month when the snowpack was 74% of normal.

January precipitation was 94% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 77% of average.

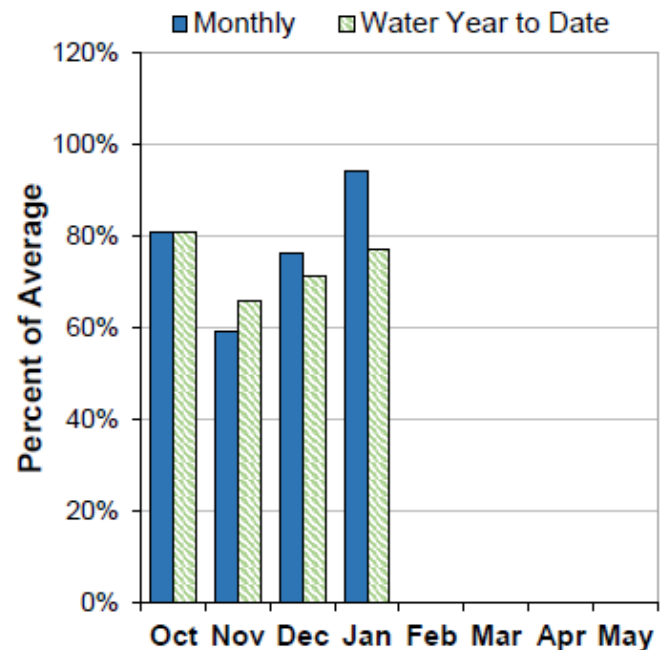
As of February 1, storage at major reservoirs in the basin ranges from 80% of average at Clear Lake to 129% of average at Gerber Reservoir.

The February through July- or September (FEB-JUL or FEB-SEP) streamflow forecasts in the basin range between 75- and 80 percent of average.

Mountain Snowpack



Basin Precipitation



Klamath Basin (cont'd)

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

KLAMATH BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)¹
Gerber Reservoir Inflow ³								
	FEB-JUL	3.8	21	33	80	45	62	41
	APR-SEP	0	3.2	10.1	70	17	27	14.4
Sprague R nr Chiloquin								
	FEB-SEP	147	200	240	75	290	370	320
	MAR-SEP	115	163	200	73	240	310	275
Williamson R bl Sprague R nr Chiloquin								
	FEB-SEP	250	350	415	78	480	580	530
	MAR-SEP	191	285	345	75	405	500	460
Upper Klamath Lake Inflow ^{2,3}								
	FEB-SEP	340	510	600	75	695	930	795
	MAR-SEP	260	405	480	74	560	765	645

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

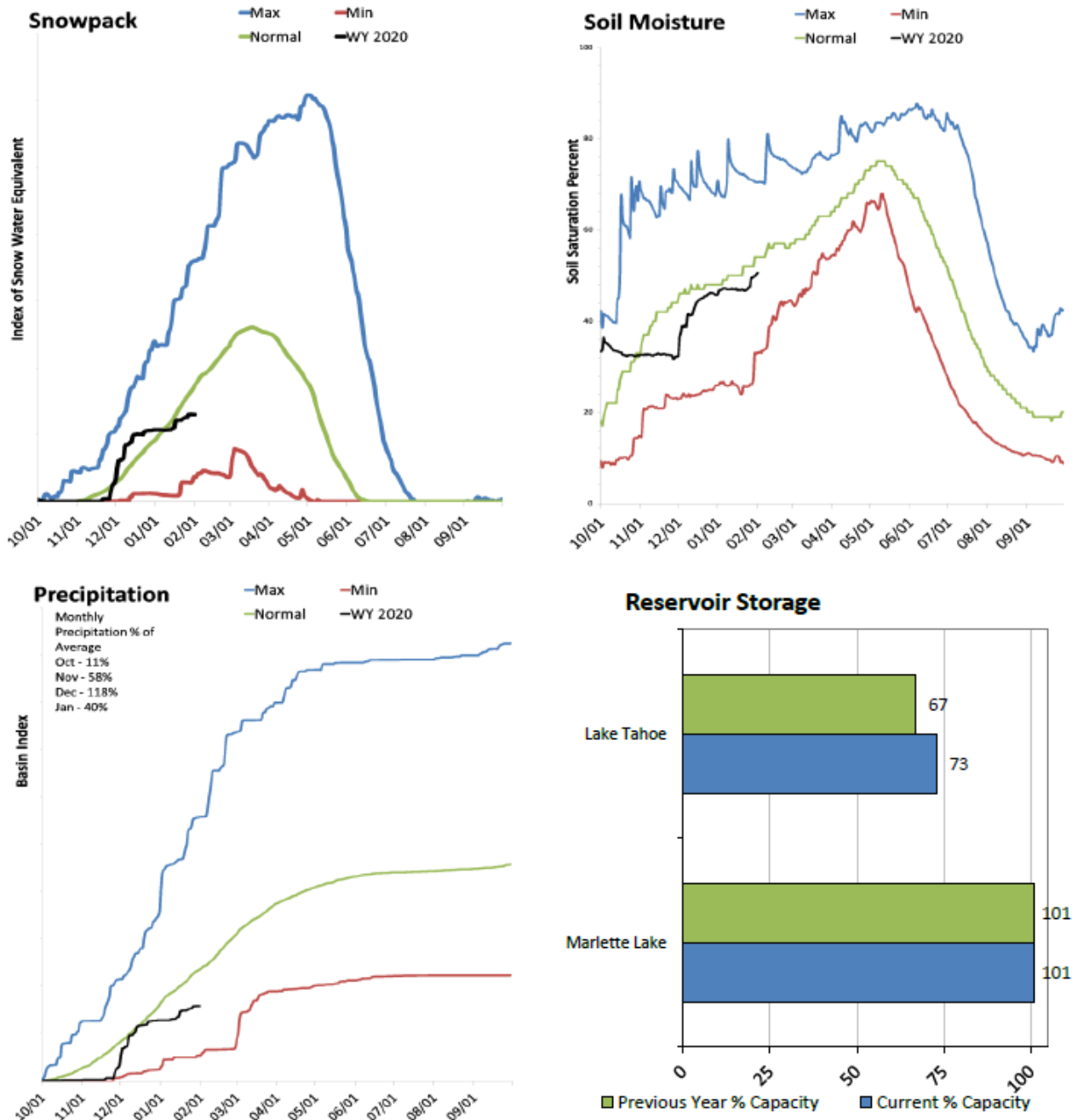
3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Lake Tahoe Basin

From the Water Supply Outlook Report for Nevada

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>):

Snowpack in the Lake Tahoe Basin is below normal at 75 percent of median, compared to 106 percent last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 67 percent of average. Soil moisture is at 50 percent saturation, compared to 51 percent last year. Lake Tahoe's water elevation is 6227.44 ft, which is 4.44 ft above the lake's natural rim and equals a storage of 540.7 thousand acre-feet. Last year its elevation was 6227.07 ft which equaled a storage of 495.3 thousand acre-feet.



Lake Tahoe Basin (cont'd)

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

LAKE TAHOE BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)¹
Marlette Lk Inflow (Acre-ft) ³								
	MAR-JUL	-33	550	945	85	1340	1930	1110
	APR-JUL	-151	351	695	84	1034	1536	830
Lake Tahoe Rise (Gates Closed) ² (ft)								
	OCT-HIGH	0.2	0.83	1.5	67	2.2	3.6	2.2
	MAR-HIGH	0.156	0.75	1.1	64	1.46	2.2	1.73
	APR-HIGH	0.1	0.48	0.8	61	1.06	1.68	1.31
Lake Tahoe Net Inflow ³								
	MAR-JUL	18.9	72	138	73	204	301	189
	APR-JUL	17.4	55	104	72	153	226	145

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

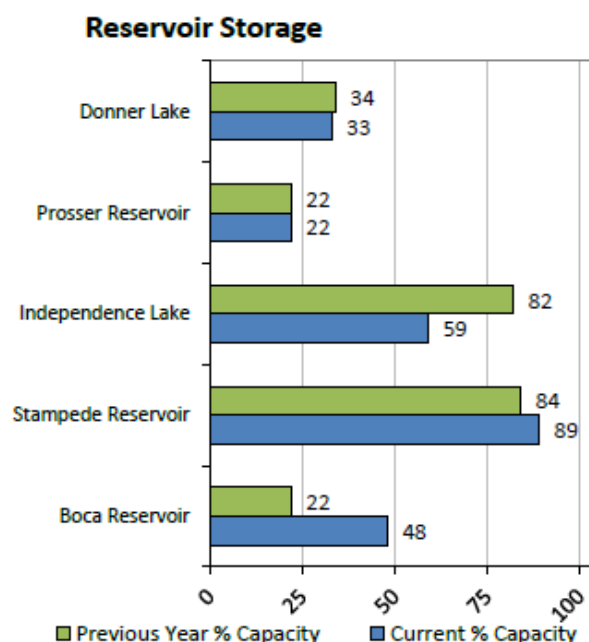
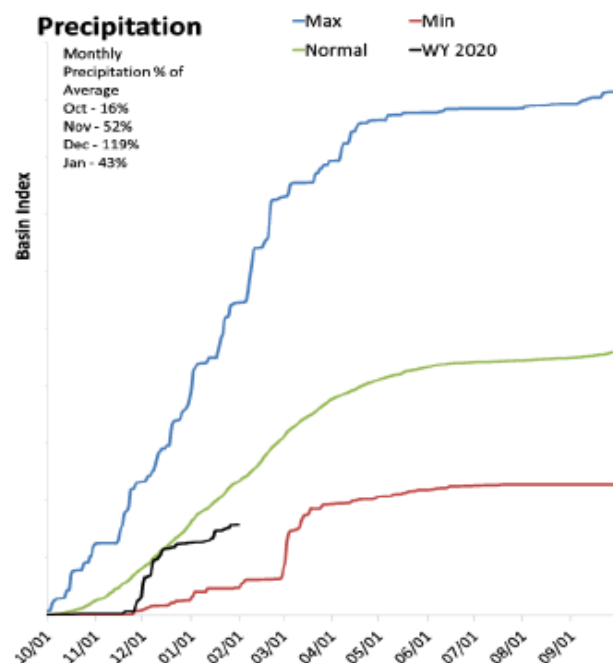
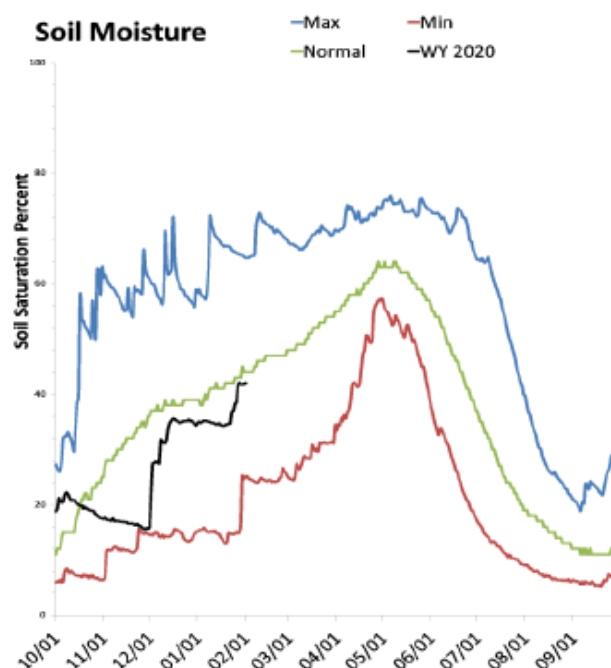
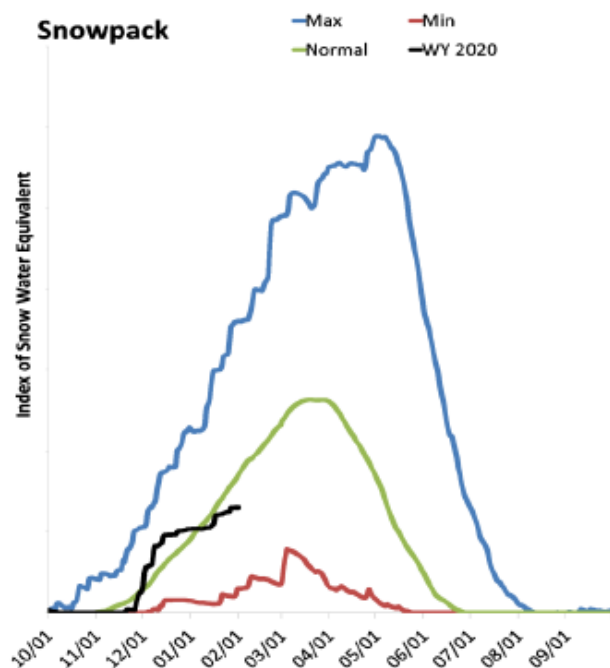
3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Truckee River Basin

Including information from the Water Supply Outlook Report for Nevada

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>):

Snowpack in the Truckee River Basin is below normal at 76 percent of median, compared to 111 percent last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 68 percent of average. Soil moisture is at 42 percent saturation, compared to 40 percent last year. Combined reservoir storage is 75 percent of capacity, compared to 69 percent last year. Forecast streamflow volumes between April and July (APR-JUL) range from 61- to 69 percent of average.



Truckee River Basin (cont'd)

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

TRUCKEE RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)¹
Donner Lake Inflow ³								
	MAR-JUL	5.5	11.2	15	69	18.8	25	22
	APR-JUL	3.8	8.7	12	67	15.3	20	17.8
Martis Ck Res Inflow ³								
	MAR-JUL	0.78	5.1	8.7	67	12.2	17.5	12.9
	APR-JUL	0.56	3.4	6.4	68	9.4	13.8	9.4
Prosser Ck Res Inflow ³								
	MAR-JUL	12.6	24	32	63	40	51	51
	APR-JUL	12	22	29	68	36	46	43
Independence Lk Inflow ³								
	MAR-JUL	2.5	6.1	8.6	64	11.1	14.7	13.5
	APR-JUL	2.6	5.7	7.9	65	10.1	13.2	12.1
Sagehen Ck nr Truckee								
	MAR-JUL	2.1	3.1	3.9	61	5	7.2	6.4
	APR-JUL	1.73	2.6	3.4	61	4.5	6.7	5.6
Stampede Res Local Inflow ³								
	MAR-JUL	11.5	43	64	71	86	117	90
	APR-JUL	5.2	34	53	69	73	102	76
L Truckee R ab Boca Res ³								
	MAR-JUL	17.9	49	70	65	90	121	107
	APR-JUL	15	37	55	63	73	95	88
Truckee R at Farad ³								
	MAR-JUL	60	146	205	67	264	350	307
	APR-JUL	75	109	160	63	180	270	255

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

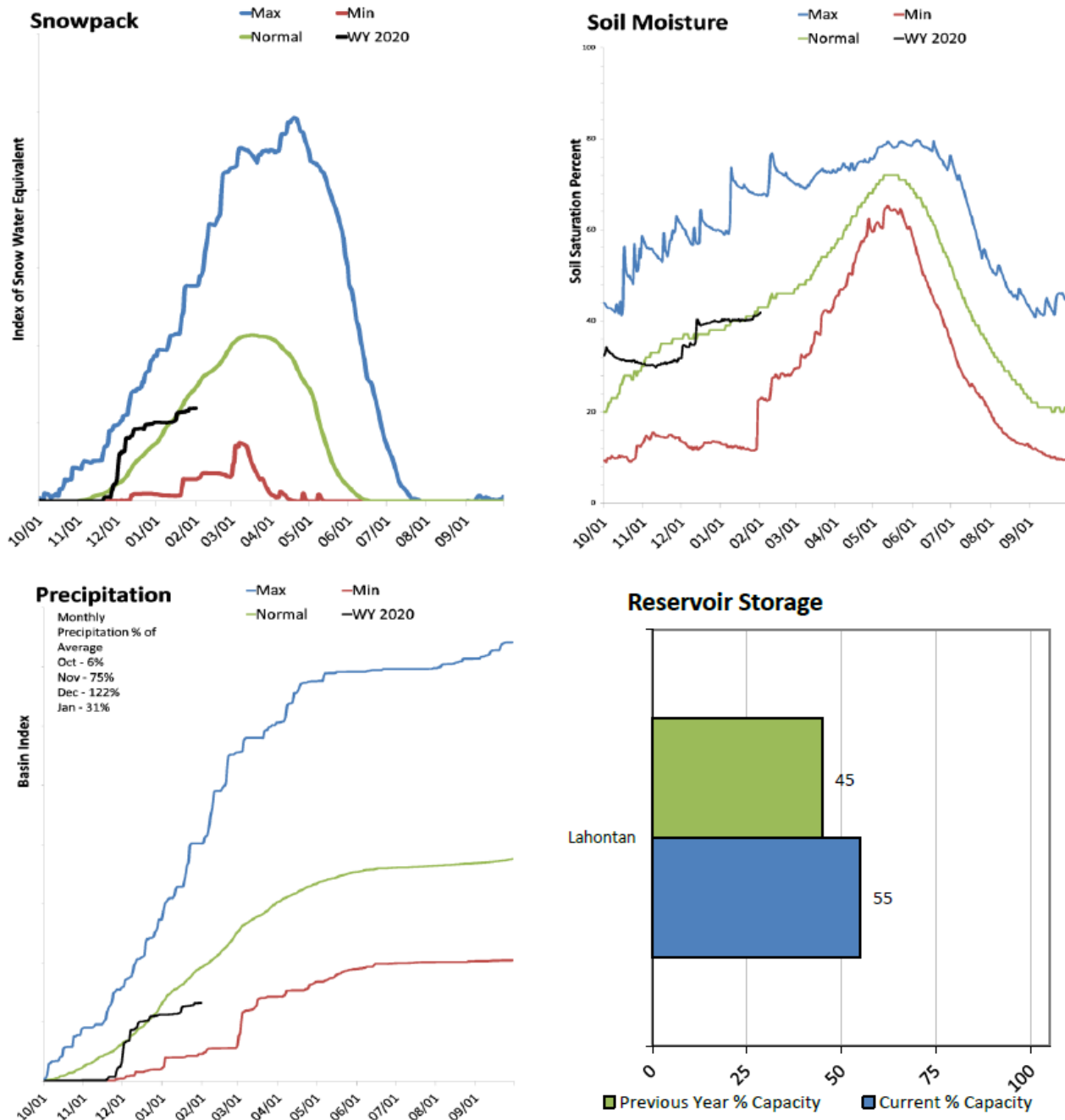
3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Carson River Basin

Including information from the Water Supply Outlook Report for Nevada

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>):

Snowpack in the Carson River Basin is below normal at 82% of median, compared to 109% last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 69% of average. Soil moisture is at 42% saturation, compared to 39% last year. Storage in Lahontan Reservoir is 55% of capacity, compared to 45% last year. Forecast streamflow volumes range from 50% to 85% of average. Forecast streamflow volumes for the East- and West Forks of the Carson River (April through July) are 80- and 81 percent of average, respectively.



Carson River Basin (cont'd)

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

CARSON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
EF Carson R nr Gardnerville								
	MAR-JUL	39	114	165	80	216	291	205
	APR-JUL	36	103	149	80	195	262	186
WF Carson R at Woodfords								
	MAR-JUL	15.2	35	48	81	61	81	59
	APR-JUL	17.9	34	44	81	55	71	54

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

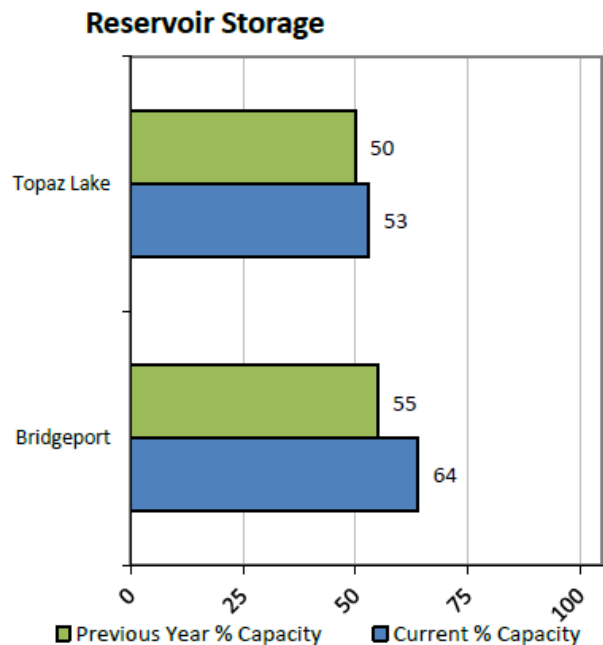
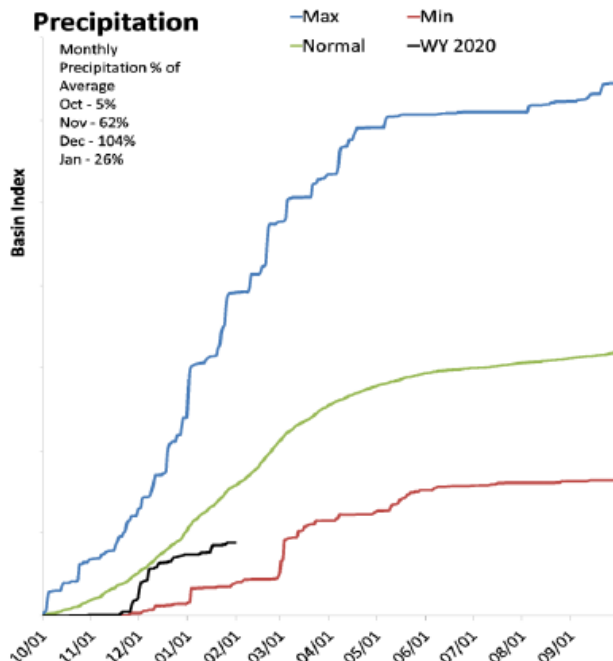
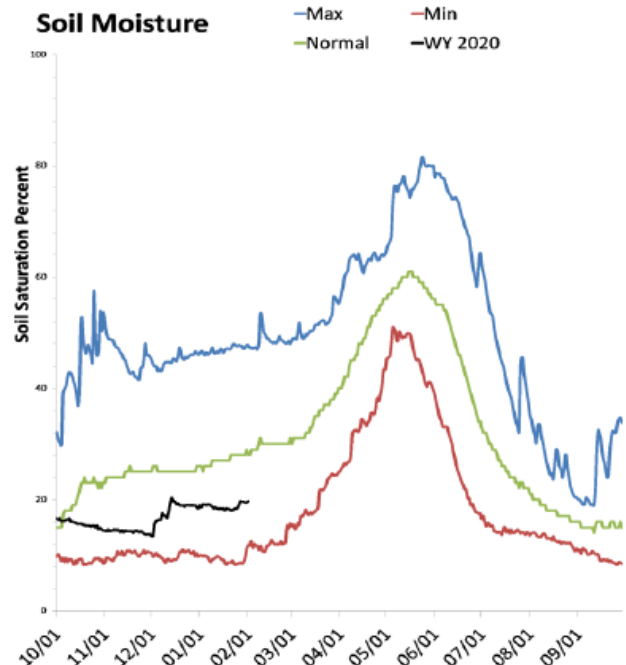
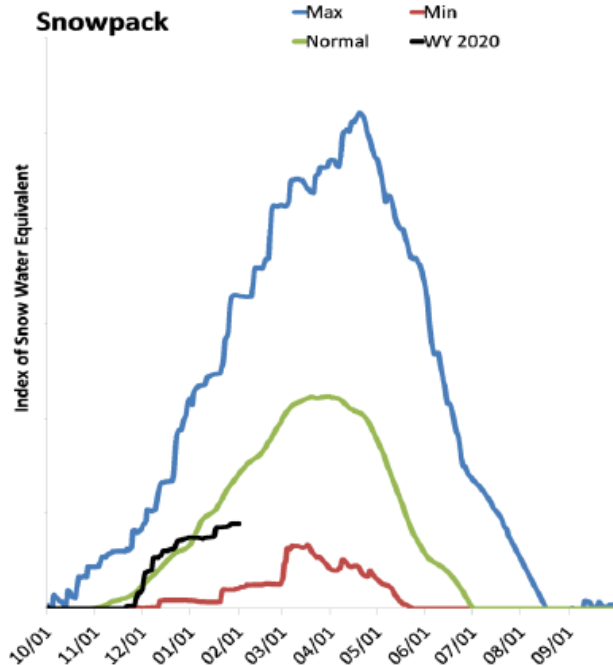
3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Walker River Basin

Including information from the Water Supply Outlook Report for Nevada

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>):

Snowpack in the Walker River Basin is much below normal at 62% of median, compared to 106% last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 56% of average. Soil moisture is at 20% saturation, compared to 21% last year. Combined reservoir storage is 58% of capacity, compared to 52% last year. Forecast streamflow volumes (April through July or August) range between 72- and 77 percent of average.



Walker River Basin (cont'd)

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

WALKER RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
E Walker R nr Bridgeport								
	MAR-AUG	4	36	57	73	78	110	78
	APR-AUG	4.1	31	49	72	67	94	68
W Walker R bl L Walker R nr Coleville								
	MAR-JUL	46	96	130	76	164	214	170
	APR-JUL	40	91	125	77	159	210	162
W Walker R nr Coleville								
	MAR-JUL	48	98	132	77	166	216	172
	APR-JUL	33	87	124	76	161	215	163

1) Averages are based on 1981-2010 reference period

2) 90% and 10% exceedance probabilities are actually 95% and 5%

3) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Owens River Basin

DWR's streamflow forecast for the Owen's River from April through September is 167 thousand acre-feet, which is 72 percent of average.

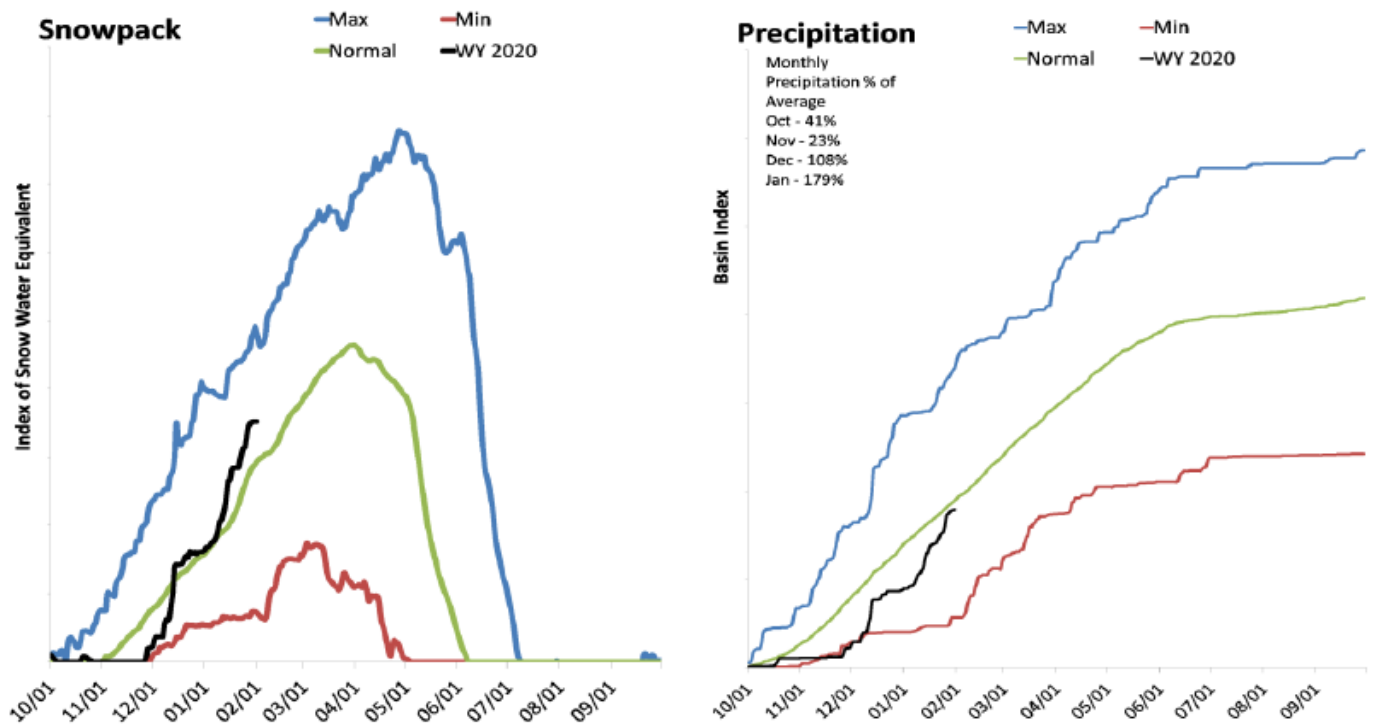
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

OWENS RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Owens R (DWR)	APR-SEP			167	72			231

Surprise Valley- Warner Mountains

Provided by Jeff Anderson, Hydrologist, NRCS Nevada Snow Survey:

Snowpack in the Surprise Valley - Warner Mtns is above normal at 122% of median, compared to 113% last year. Precipitation in January was much above average, which brings the seasonal accumulation (Oct-Jan) to 95% of average. Streamflow forecasts for Davis Creek, Bidwell Creek and Eagle Creek have been permanently discontinued until stream gaging can be re-established.



Lower Colorado River Basin

Including information from the Water Supply Outlook Report for Nevada

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>):

As of February 1, 2020, storage in Lake Mead was at 43 percent of capacity, up 779 thousand acre-feet (KAF) from this time last year. Snowpack in the Colorado River Basin above Glen Canyon Dam was 111 percent of the median, compared to 96 percent last year. The forecast streamflow volume for Lake Powell Inflow is 80 percent of average for April through July. The actual flow will be dependent on upstream reservoir management and diversions.

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	11274.0	10495.0	20452.0	26159.0
Lake Mohave	1653.0	1666.0	1676.0	1810.0
Basin-wide Total	12927.0	12161.0	22128.0	27969.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Spring Mountains	0		
White River	1	76%	96%
Virgin River	8	144%	115%
Colorado R above Glen Canyon Dam	105	111%	102%

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast

LOWER COLORADO RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% KAF	10% (KAF)	30-yr Avg (KAF)
Lake Powell Inflow (3)	APR-JUL	3160	4610	5750	80%	7020	9110	7160

1) Averages are based on 1981-2010 reference period

2) Max and Min are 5% and 95% chance that the forecast actual volume will be exceeded

3 Streamflow is adjusted for upstream storage

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snowcourses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

This publication is posted with other Water Supply Outlook Reports for California at:
<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/snow/>.

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